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ANNUAL REPORT FOR 1931

OF NORTH PACIFIC INVESTIGATIVE COMMITTEE

AND PROGRAM FOR FISCAL YEAR 1933

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March 22, 1932

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ANNUAL REPORT FOR 1931

OF NORTH PACIFIC INVESTIGATIVE COMMITTEE

AND PROGRAM FOR FISCAL YEAR 1933

INTRODUCTION

The North Pacific Investigative Committee met for two full days March 15 and 16, 1932; the sessions were presided over by Regional Forester Buck. Those present at part or all of the meeting were:

Committee Members

Messrs. Buck, Munger, Harriman, Sherrard, Ames, Hanzlik, Kümmel, Kavanagh, Brundage, McArdle, Keen, and Lachmund.

Others

Messrs. Matthews, Wilson, Lodewick, Johnson, Rapraeger, Isaac, Kolbe, Shepard, and Andrews, of the Experiment Station; Jaenicke, Guthrie, Horton, Griffith, Ericson, Lund, and Hoffman, of the Regional Office; Mielke and Childs of Forest Pathology; Beal of the Bureau of Entomology; Dague of the Weather Bureau; Gowen of the California Forest Experiment Station.

GENERAL MATTERS NOT CONNECTED WITH SPECIFIC PROJECTS

Name of the Committee

Since the name "Investigative Committee" is somewhat misleading, it was urged that the name of the Committee in all Regions be changed to "Forest Research Committee". The local Committee would then be known as the North Pacific Forest Research Committee.

Future Meetings of Committee

It was felt inevitable that in the course of the year new and urgent projects would be proposed not anticipated at the annual meeting, but that material departure from the approved program should not be made without formal approval of the Committee. It was decided

therefore that when new projects came up, a meeting of the Committee should be called to approve or disapprove such proposals and decide what approved projects could best be displaced by the new work.

It was also felt that the usefulness of this Committee in the region could be increased if representatives of other agencies were invited to attend, particularly the State Foresters and the managers of the fire protective and trade associations. It was suggested that the program of the two-day meeting might be so arranged that these persons need attend only while the matters in which they were particularly interested were up for discussion. The Committee thought that the Biological Survey ought to have representation at these meetings, and only because both of the Biological Survey principals were out of town was this not accomplished this year. The suggestion was made that the Investigative Committee meeting might be combined in some way with the Advisory Council meeting. This suggestion was not adopted.

Character and Distribution of Investigative Committee Reports

In line with recommendation No. 4 of the 1931 Forest Supervisors' Meeting, the Committee considered ways by which its annual report might be made more available to field officers. It was deemed impossible to condense the wealth of material covered by this report into such form that it could be absorbed by the hasty reader in a few minutes and yet be of any use to him. However, the Committee urged a special effort to be made to present the material in condensed, readable, instructive form, and to index the contents for convenience of reference. The Committee also decided to mimeograph the project sheets this year and distribute them with the report proper.

Recommendations of Forest Research Council of the Pacific Northwest

The Advisory Council met March 9 and the program for the Experiment Station is herewith presented in the light of the recommendations and approval of the Council.

Recommendations of Forest Supervisors' Meeting

The recommendations of the forest supervisors under the subject "Research" (pp. 72-74 of Committee Reports, Region 6) were read to the Committee and the Committee felt that the action it was taking was helping to carry out these recommendations. Likewise the recommendations in the supervisors' letter as to the ensuing year's program were presented to the Committee and considered in shaping the program.

Methods of Disseminating Results of Research and Getting Them into Practice

A problem facing the Experiment Station was discussed, namely, the lack of publication channels for certain classes of material not suitable for Department of Agriculture publications. The Experiment Station is turning out a greater number of progress reports and reports of temporary or local interest than the trade journals can take, and there are in this region almost no other avenues of publication. The Committee had no fruitful suggestions to offer, except further effort to seek publication by state agencies or through a high grade of mimeographing.

Throughout the sessions attention was focused on means of getting the results of research into practice, and the feeling was that the methods now being employed were effective. Regional Forester Buck spoke of several important instances where the findings of research were being put into immediate practice on the national forests or service tests of their practicability were being inaugurated. The Committee commended the plan of holding a series of seminars with consulting for-

est engineers, logging superintendents, and the like, to disseminate the results of the selective logging study.

Transportation Planning and Radio Communication

National Forest transportation planning was described to the Committee by Mr. Grefe in a very interesting fashion, as was also radio communication by Mr. Horton. Their inclusion in this report was considered, but by vote it was decided that they were not primarily research but rather the application of known principles, and therefore should not be set up as research projects.

Experimental Forests and Ranges

The Committee on experimental forests and natural areas reported satisfactory progress during the past year in the examination of several areas, and the definite recommendation for withdrawal of several under Regulation L-20.

Experimental Forests - During the past year the Pringle Falls Experimental Forest, typical of central Oregon ponderosa pine and associated species, has been examined, approved and withdrawn by the Forester and already put to considerable use. It embraces an area of 7,520 acres.

On the basis of a considerable amount of field work the past season, the committee has decided upon the boundaries for the Wind River Experimental Forest, typical of the central portion of the Douglas fir type. The proposed experimental forest lies in two blocks, one of 6400 acres on Trout Creek in virgin timber and 1902 burn, and the other on Panther Creek in 90-year-old second growth covering 3500 acres. The report recommending withdrawal is about ready to send to the Forester.

Experimental Ranges - No experimental ranges have yet been recommended for withdrawal, but Mr. Kavanagh reported that an area on

the Whitman National Forest seemed suitable for this purpose where, by an arrangement with the Oregon State Agricultural College, the experimental herd of one of its branch stations may be pastured during the summer.

Natural Areas - The Metolius Natural Area of 1,440 acres, Deschutes National Forest, has been withdrawn as typical of the central Oregon ponderosa pine type.

For a Douglas fir natural area the present Wind River Natural Area will be enlarged by the addition of contiguous territory in the proposed Trout Creek block of the experimental forest. The report recommending this withdrawal is about ready to send to the Forester.

A part of the Pringle Falls Experimental Forest will be set aside as a natural area; its exact limits have not yet been decided upon.

The Ochoco Divide Natural Area of 2,200 acres, typical of the Blue Mountains, has been reported upon by the supervisor, but not yet acted upon by the Committee.

The Quinault Natural Area of Sitka spruce and hemlock of 1,435 acres has been reported upon and recommended, and is now in the hands of the Forester for action.

The Nooksack Natural Area in hemlock-cedar-fir type, typical of the northern Cascades, aggregating 1,740 acres, has been reported upon by the supervisor but not yet acted upon by the committee.

Several areas in Douglas fir, ponderosa pine, Sitka spruce, and Port Orford cedar have been given preliminary consideration by the committee.

NEW PROJECTS

At the committee meeting a year ago, eight new activities or studies were suggested for initiation in the fiscal year 1933 contingent upon additional appropriations being provided. The need for these studies was at that time thoroughly discussed and justified in the report of March 1931, pages 77 to 88. The status of these proposed projects is as follows:

1. Establishment of range research in the Northwest. No allotment has been provided for the F. Y. 1933 so that the project is in the same status as a year ago, and the need for it as great as then stated.

2. Control of erosion and regulation of streamflow in central Washington, and

3. Control of erosion in eastern Oregon - No appropriations are provided for these two studies for the F. Y. 1933, so that they are in the same status as a year ago. The desirability of this work is even more apparent now than as stated by the Committee a year ago. The only work done in this region is a preliminary survey of the problem made by local research and administrative men in company with Mr. Forsling of the Intermountain Station.

4. Management of second growth stands of Douglas fir - No allotment is in sight for this project and no work done upon it. The Committee feels this to be the least pressing of the several proposed projects.

5. Growth and yield studies in the spruce-hemlock region - If the time of the Experiment Station mensurationist were not very largely obligated for the ensuing year by the growth phase of the

forest survey and the extension of the study of even-aged ponderosa pine stands to other regions, he would be able to make a beginning on this project next year, even without an additional allotment. As it is, it is planned to make a small beginning in the spring of 1933 and the project sheet so provides.

6. Forest survey of eastern Oregon and Washington - The forest survey allotment to this region for the F. Y. 1933 will apparently allow a beginning of the survey in the ponderosa pine region. Ample appropriation for the F. Y. 1934 is necessary to bring the survey of this region to early completion. This study is considered a part of the project "Forest Survey of Oregon and Washington", and is so treated in the project sheet.

7. Forest Economic Study of the new public domain - Allotment for this project was provided for the F. Y. 1932, and the project is now under way. A continuation of the allotment on a larger scale for the F. Y. 1933 should be provided and that is anticipated in the financial set-up accompanying this report.

8. Forest insurance in the ponderosa pine region - It is contemplated that as the insurance study of the Douglas fir region approaches completion the project will be extended to the ponderosa pine region, and the project sheet "Forest Insurance" provides accordingly. If the F.F.C. allotment is continued to this Station as at present, this will be possible.

In view of the economy program, the Committee felt it inadvisable to recommend any additional expansion of present research activities other than to reiterate its recommendations of a year ago, particularly for the establishment of range research in the Northwest and for erosion-streamflow studies, the need for which is set forth on page 4 and pages 77-81 of the March 1931 report.

No other new projects, not now under way, are recommended except that certain new phases of existing projects will be begun as treated in the project sheets, particularly under forest products. The current program of going projects was, in the minds of the Committee, well gauged to meet immediate needs and is all that the F. Y. 1933 allotment will take care of.

TECHNICAL PERSONNEL OF THE PACIFIC NORTHWEST FOREST EXPERIMENT STATION MARCH 1, 1932

The only losses to the technical personnel of the Station during the year were three; namely, Howard Spelman, who was on furlough, by death; A. H. Hodgson and A. G. Simson, both by transfer to the Regional Forester's Office. The Section of Forest Products of three men was transferred from the Regional Forester's Office to the Station April 1, 1931. There have been three other additions to the staff, namely, S. A. Wilson, J. E. Lodewick, and W. G. Morris.

Year-Long Personnel of the Station, March 1, 1932

Thornton T. Munger, Principal Forest Economist, Director

Forest Economics

Axel J. F. Brandstrom, Senior Forest Economist, selective logging
Harold B. Shepard, Senior Forest Economist, forest insurance
Sinclair A. Wilson, Senior Forest Economist, the new public domain

Forest Products

John E. Lodewick, Silviculturist, in charge
Herman M. Johnson, Assistant Forester, utilization studies
Elmer F. Rapraeger, Junior Forester, logging and milling studies

Forest Management Studies

Walter H. Meyer, Associate Silviculturist, forest mensuration
Richard E. McArdle, Associate Silviculturist, fire studies
Donald N. Matthews, Assistant Forester, fire studies
Leo A. Isaac, Assistant Silviculturist, natural reproduction studies
Ernest L. Kolbe, Junior Forester, natural reproduction studies
William G. Morris, Junior Forester, silvicultural studies

Forest Survey

Horace J. Andrews, Senior Forest Economist, in charge
Robert W. Cowlin, Associate Forest Economist, assistant in charge
Charles W. Kline, Timber Expert, adjustment cruising
Percy N. Pratt, Timber Expert, adjustment cruising
William J. Wakeman, Timber Expert, adjustment cruising
Warren H. Bolles, Assistant Forester, field mapping and cruising
Paul D. Kemp, Assistant Forester, field mapping and cruising
Floyd L. Moravets, Junior Forester, field mapping and cruising
Philip A. Briegleb, Junior Forester, field mapping and cruising
Edward D. Buell, Junior Forester, field mapping and cruising

Allotments and Expenditures of Experiment Station

The net allotments to date for the fiscal year ending June 30, 1932 to the Pacific Northwest Forest Experiment Station are as follows:

Forest Management	$42,480.00
Forest Survey	78,500.00
Forest Insurance	8,500.00
Economics of Forestry	13,600.00
Forest Products	17,720.00
Improvements	150.00
Total	$166,950.00

Expenditures for the major lines of work during the fiscal year 1931 were as follows:

Silviculture	$ 9,783.00
Mensuration	9,308.00
Fire	9,915.00
Forestation	864.00
Forest Survey	78,615.00
Forest Insurance	9,240.00
Economics of Logging	11,500.00
Forest Products (portion of year under Regional Forester)	20,296.00
Improvements and Equipment & Supplies	1,250.00
Total	$150,771.00

REPORT AND PROGRAM OF INVESTIGATIONS OF THE PACIFIC NORTHWEST FOREST EXPERIMENT STATION AND OF THE REGION SIX OFFICE

Botany

Phenology - For the past five years phenological observations have been made at one or more stations in each of the national forests in the Douglas fir region, and by three agencies outside the Forest Service. During the past year some 1,500 individual observations were recorded. The committee felt that the work indicates that the present system is giving the desired results and that the project should now be expanded to cover the pine region of Washington and Oregon. They decided that the plots now being observed by forest rangers for the development of range plants should as far as practicable be used for this study by adding observations of forest trees.

Mr. Keen mentioned the phenological work of the Bureau of Entomology and some of the difficulties that they encountered because of abnormal individuals. Mr. Munger explained that this difficulty is overcome in the present system by examining carefully a few individuals and checking the results against the growth status of a large number of the same species. Under this plan only the average date is considered. Mr. Lachmund brought out the value of phenological data in blister rust work in determining the direction the disease is most likely to spread at a given season. No change was recommended in the conduct of this project in the Douglas fir region.

Forestation

Seed - During the past year the six pedigreed ponderosa pine plantations and the six Douglas fir heredity plots were examined. The Douglas fir plantations, now 18 years from seed, have reached a

stage to permit an analysis of the data to determine adaptability and hereditary characteristics of the various lots. These computations will be made at an early date and a report for publication is to be prepared during the next few months. Mr. Kümmel expressed the need for these data in forestation work.

Tests to prolong the life of noble fir seed by holding it in cold storage have now been completed and the results will be published. The study revealed that seed could be held for a period of four years in cold storage without material loss of viability, while under normal storage conditions it could not be held more than a year.

Nursery Practice - The production and field testing of various classes of Douglas fir seedling stock for planting in place of the standard transplants continued to be the major activity in nursery investigations. 56 new field tests were made in four localities embracing four density classes of 2-0 spring-sown stock grown from low altitude seed, making a total of 94 tests to date. In addition new lots of seedlings are under way in the nursery for field testing in 1932 and 1933. Results obtained in the new tests were more variable than in previous years and several of the lower density classes showed up to better advantage in comparison with transplants than ever before. It is very evident that the density at which the trees are grown in the seedbed has a great influence on the value of 2-0 stock and it is probable that certain of the lower density classes can be used successfully.

Continued use as a regular feature of applications of sulphuric acid ($\frac{1}{4}$ oz. per sq. ft.) to seedbeds for prevention of damping-off, has given satisfactory control in all classes of beds except fall sown high altitude Douglas fir. It is apparent that additional research is

necessary for this class.

In the relatively minor phase having to do with the proper technique for species other than Douglas fir, considerable difficulty is being encountered in obtaining satisfactory production of western hemlock and red alder, largely in the matter of germination. To what extent the generally poor stands are the result of poor quality seed or to faulty nursery practice is not yet clear.

Planting and Seeding - Several different phases are under investigation concerning both Douglas fir and other species less largely used in reforestation work in this region. In the study of the proper density of planting for Douglas fir, the test plots of various spacings established in 1925 have reached an age where no additional replanting of fail spots is practical and examinations need no longer be made annually. These plots will soon furnish specific data on the length of time required with different spacing for the establishment of a complete cover. In the study of the effect of aspect and brush cover on survival it is apparent that though initial mortality is likely to be considerably greater on southerly than on northerly slopes with Douglas fir, subsequent losses are not greatly different. Noble fir and silver fir show a still greater susceptibility to aspect, and mortality appears to continue for a longer period after planting. On brushy areas, initial mortality continues for a longer period than in the open. With ponderosa pine on the Umpqua Forest first year survival was better in the open than in ceanothus brush, while on the Crater Forest a moderate degree of overhead shade from reserve trees continued to be beneficial to survival in the third year. In two new tests in different localities of season of planting ponderosa pine, spring planting was again shown to give materially

higher survival than fall planting.

Additional trials were made of direct seeding of small seeded species in the fog belt, (Wn. hemlock, Sitka spruce, western red cedar) and examinations were made of previously sown plots. Sowing of 1929 and 1930 averaged 800 to 1000 seedlings per acre and the 1931 seeding gave good germination in June. Plots previously established in Douglas fir plantations to study the extent and effect of animal cropping were re-examined and the study was extended to ponderosa plantations. In the former it is pretty definitely established that injury decreases rapidly after the first two or three years and that while height growth may be somewhat retarded during this period, actual mortality is not ordinarily excessive. In ponderosa plantations the initial mortality is likely to be more serious. In the study of the suitability of red alder for fire breaks on snag free areas, progress has been delayed by lack of sufficient stock to plant representative strips. Such quantities as have been available have been used to test the adaptability of the species to the less moist sites rather than to form actual fire breaks.

Exotics - The scope of studies in this phase of forestation continues the same as in previous years, namely the establishment of an arboretum of native and exotic species at the Wind River Branch of the Experiment Station, and further testing in the field by means of larger demonstration plots, those species which give some promise of value in this region. At the arboretum 18 new plantings were made in permanent location and 27 lots of seed or trees were acquired for propagation in the arboretum nursery, among them the rare Alpine Larch. A total of 132 different species or races are now represented there. A progress report on the results of the tests to date is in preparation.

One new demonstration plot of bigtree was established on the west slope of the Cascade Range, and several plots of various species previously established were examined. No exotic species thus far tried has shown any exceptional merit and most have proven distinctly inferior to native trees.

Management

Natural Regeneration of Douglas Fir - The study of natural regeneration of Douglas fir with its many phases is a long-time project; with the vast acreage of this highly productive region still uncut and the unsatisfactory restocking on much of the cut-over land, this study stands out as one of the major projects of the Station. Several phases of the study have yielded results and are nearing completion, while changes in both economic and stand conditions suggest new phases that require attention. At present the project involves the study of:

(a) Physical and biological factors that govern regeneration.

(b) Germination and survival on a total of over 300 plots in 24 localities.

(c) Production, dissemination and life of seed after falling.

(d) Present seed tree system and other seed sources.

(e) Grazing and reproduction on Douglas fir cut-over lands.

(f) Douglas fir slash disposal.

The scope, present status and results to date in each of the above phases are outlined on the project sheet M, Douglas fir, and only a broad picture of the situation will be given here.

To date the study has brought out many definite things; heavy seed crops are infrequent, often 5 to 10 years apart; the life of seed after falling is short, little living beyond the first year; single seed trees are inadequate, many are lost and those remaining do not

produce enough seed; rodent consumption of seed is great and a bumper seed crop is necessary to make a general showing in reproduction; seedling mortality is excessive and heat injury, drouth, frost and rodent consumption are listed as major causes of loss, any one of which might take most of a crop; shade was found important, comparatively few seedlings surviving under complete exposure; not more than 25 per cent of the sample areas is fully restocked in five years, the rate is proportional to seed crops, and survival conditions point to wind-blown rather than soil-stored seed as the source of reproduction; during five years 60 per cent of freshly burned areas studied was touched by a second fire, burning leaves sites more severe through consumption of slash-shade and humus, and by causing excessive heating and evaporation through charring the surface.

The study as a whole indicates positively that if more adequate natural stocking is to be obtained a change in procedure is necessary to leave cut-over lands in a less severe condition. Areas must be broken up by less continuous clear cutting, thereby providing a more adequate seed supply and firebreaks that will aid in slash disposal, and make possible less burning and reburning.

It is fortunate that desirable silvicultural changes fit, with but slight conflict, the present trend toward economic selective cutting, and toward the breaking up of future cut-over areas by belts or blocks of green timber for fire protection and for seeding purposes.

The proper <u>disposal of logging slash in the Douglas fir region</u> continues to be a most important problem. The study is directed toward the formulation of basic principles needed to determine how any particular type of cut-over area should be treated to obtain minimum present and future fire hazard and prompt reforestation. All pertinent

information gathered by other agencies is being summarized and independent studies are being made in typical slash areas on which the complete slash history is known. There are now 58 permanent sample plots for which 132 measurements or remeasurements have been made, on some plots for the fourth time. Historical data were obtained for 28 additional areas. All data obtained to date have been analyzed, but additional information must be obtained before a formal report can be prepared. In particular some of the ideas which have been formulated concerning the technic of slash burning must be tested before definite conclusions are made on this subject.

Ponderosa Pine - Investigations in ponderosa pine silvicultural practice include comparisons of several methods of cutting and slash disposal as to their effect on growth and mortality of reserve trees, on establishment of reproduction and other vegetation, fire hazard, and the financial returns. Each of these items is a study in itself, but these are joined in this project to get a complete picture of the silvicultural situation brought about by various treatments of the stand at the time of cutting. A phase of the slash disposal problem which deals with the rate of decay of debris resulting from logging is carried on as a separate project by the office of Forest Pathology on a cooperative basis with the Station. Likewise the study of insect activity and damage in relation to the several methods of cutting is carried as a separate project by the office of Forest Entomology.

There are 81 permanent plots in this project, 14 of which have been cut and 9 ready to be cut. The majority of the plots are ten acres in size. Recent analyses indicate that the plots should be larger to give suitable data on the growth and mortality of the reserve trees.

Plans will be made this year for the establishment of plots with considerable more acreage. Some plots may be located on the newly established Pringle Falls Experimental Forest which is suitable for this work.

An analysis will soon be made of the data resulting from the method of cutting plots, in cooperation with the findings of the two ponderosa pine mill scale studies and the growth and yield study, to make a comparison of the economic results that may be obtained after a period of years by the several methods of cutting in virgin stands.

Methods of thinning Douglas fir - There has been no activity in this project during the past year as no plots have come up for remeasurement and no new ones were established. No work is contemplated for next year unless opportunity arises on a national forest to interest a commercial operator of small products to make an extensive thinning under the supervision of the Forest Service, so that the heavy expenses of making the cutting may be partly or wholly defrayed.

Methods of thinning ponderosa pine - Experiments in ponderosa pine thinning have been made along different lines than those in Douglas fir. In ponderosa pine, the thinnings have been made in sapling stands which are becoming too dense for their own good. Small plots in five national forests are under observation. Mr. Kandall asked whether thinnings could not be made in sapling thickets over large areas by some cheap, machine method which will make holes or lanes in the reproduction to allow the remaining trees to assert their dominance. Mr. Meyer explained that it was the expectation that the extensive conduct of thinning would be possible only by such methods, and that the present system of costly hand thinning and

repeated observations were made only to establish the principles.

Mensuration

Douglas fir - A set of volume tables is being prepared which include data on 7000 trees gathered from the entire range of Douglas fir. Only mature trees are considered, these being divided into groups according to their site quality. An analysis showed that the effect of site upon volume was so small as to allow certain combinations thus greatly reducing the number of tables. Several degrees of utilization had to be included since that of the Rocky Mountain region does not conform to the utilization on the Pacific Coast. The complete set includes 12 tables and permits the cruiser or mensurationist to get cubic-foot or board-foot volumes for Douglas fir in any part of its range and to compare these values accurately with those from another region.

Another phase of Douglas fir mensuration consists in the maintenance of 36 permanent sample plots which are furnishing a check upon the normal yield tables, information on the relation between stocking and growth, and on the occurrence and rate of mortality. Eleven plots were remeasured and the computations made during the past year.

Ponderosa pine - The completion of the ponderosa pine growth and yield study has been delayed somewhat because of several urgent projects which demanded priority. However the computations of growth rates in selectively cut stands are practically completed. Additional study is being made of the growth of individual trees in order to strengthen the conclusions formed from the investigation of area yields.

An interesting phase of the study has been the investigation of the existence and occurrence of growth cycles which might be related

to climatic cycles. Since the growth rates during the past 15 years have been the lowest ever experienced on many of the areas, it was necessary to determine whether these reductions in growing capacity are of rare occurrence or whether they are periodic in nature. If rare, the yield tables built up on them would be too low for normal conditions. If recurrent then no allowance need be made provided the basic data includes complete growth cycles. Preliminary tests show that they are recurrent and have periods of slow and fast growth averaging about 40 years but varying greatly around this average.

The study of yields of even aged stands of ponderosa pine came to the attention of the Committee. The Washington Office desires that data be gathered from the rest of the range of ponderosa pine, and to be combined with that obtained in Oregon, Washington, and Idaho, and that they be analyzed in their entirety. This may be done during the coming field season with the detailing of Meyer to coordinate the work in the several Regions. This implies that each Region or Experiment Station furnish the necessary assistance, under the part-time supervision of Meyer, to measure a sufficient number of plots to form a satisfactory sample of the Region. In this way the entire range can be covered in one summer and the material be prepared immediately in the next office season. If the additional data cannot be gathered during the coming field season, a yield table should be constructed from the data on hand, since such a table is necessary for the prediction of yields in certain portions of the selection forest, such as a partially-stocked reproduction stand.

Spruce-hemlock - The two permanent growth plots did not come up for remeasurement this past year.

Sufficient data are at hand for the preparation of volume tables for Sitka spruce and western hemlock which will be suitable for purposes of volume computation in the contemplated growth and yield study in this type. No attempt will be made to start this study this year beyond a preliminary survey of conditions and literature, drafting a working plan and locating suitable areas for study. The Committee considers this project of prime importance.

Protection-Fire Studies

Pf-1 Attack - The time factor in fire control is being studied by analyzing the individual reports of nearly 13,000 fires. With past fire history as a background, definite standards for speed of attack are set up for each major cover type according to the relative inflammabilities and probabilities of fires starting. On the results of this study are based, to a considerable degree, the plans for placement of protective personnel and the location of proposed fire roads and trails. After making analyses for individual forests, similar analyses are made for groups of several forests. These analyses are completed for the 22 Forests in the Region, and for two groups of these Forests; analyses for two other groups are now in progress and the study will be completed this year.

Visibility range of lookouts for smoke from Class A fires is being studied intensively to determine the maximum effective distance at which lookouts can see the smoke of small fires under average summer visibility conditions. The results of tests made on four National Forests last summer indicate that this distance probably is not greater than about 6 miles; this, however, has not yet been definitely determined, and the study is to be continued this year.

This study, originally assigned to Four Forests as an administrative study, is now assigned exclusively to the experiment station.

Fire Suppression Tools and Equipment - Studies in this field will hereafter be carried on either as administrative studies or by the Fire Equipment Bureau under Mr. Comm, of the Washington Forest Fire Association, and therefore no major project is set up this year for study of tools and equipment.

Pf-2 Behavior - The reports on lightning storm occurrence and behavior annually submitted by Forest Service lookouts were analyzed for the period 1925 to 1931, inclusive. The daily occurrence and behavior of storms was shown on maps, yearly summary maps were compiled, and zones of lightning storm frequency outlined. Similar maps for lightning fires also were prepared. It was found that although there were general trends in direction of storm movement there were no very well defined paths of movement. It was found also that there are a very few days each year when storms are of widespread occurrence, and that on these comparatively few days more than two-thirds of all lightning fires originate. With an average of only 2 fires per "local" storm day as against an average of 35 fires for each day of "general" storm occurrence, it is obvious that present attention in forecasting should be directed toward the days of general or widespread storm occurrence. A report on this study is in preparation.

Static and lightning storms have been studied intensively for the past 4 years; previous to this static was studied for 5 years in its relation to forthcoming periods of low relative humidity. The records obtained during these 9 years were thoroughly analyzed to determine whether or not static intensity as measured by this particular method could be used to detect the building up of lightning

storms in the vicinity of the static-measuring station. It was found that the static measuring devices recorded very faithfully the occurrence of all thunderstorms within about 500 miles of the instruments but in no instance gave any warning of storm occurrence. This study has been dropped from the program, except that arrangements have been made with the Physics Department at Reed College to continue the investigations, using other methods for measuring static intensity.

The behavior of large going-fires is to be continued. No field work was done on this project last summer. It was pointed out that an analysis of 13,000 fires in Washington and Oregon shows that only 4 per cent of these fires are burning 97 per cent of the total acreage and account for 75 per cent of all suppression costs; furthermore, on each of these large fires most of the fire spread occurs in a relatively short time, during so-called "blow-ups". The purpose of this study is to discover what combinations of physical factors contribute to the abnormally rapid spread of fire.

The development of some means to measure the seasonal or accumulated fire hazard is progressing. In one method which has been developed, the moisture content and resultant inflammability of wood cylinders is used as an index of hazard. This method appears promising but many technical obstacles must be overcome before the method can be put to an extensive practical test. The study will be continued.

Pf-3 Damage - A study of fire damage was included in the program for the past year but pressure of other work prevented any attention being given it. It is planned to begin the study this year. An immediate need for fire damage information was expressed by the forest survey in connection with the depletion phase of that work. Mr. Griffith,

representing Public Relations, asked for specific and localized studies of fire damage which could be used in publicity aimed against the practice of "light burning". Most of the discussion on fire research centered on this particular topic and it appeared to be the opinion of the group that there already was available sufficient information to use in publicity against light burning. Mr. Munger pointed out that light burning influences many phases of forestry---streamflow, grazing, and recreation, as well as timber growing.

Mr. Dague, of the Weather Bureau, reported on the activities of the fire-weather warning service. He stated that the men engaged in this work were compiling various essential statistics, such as normal number of days of low relative humidity, maximum and minimum temperatures, normal precipitation, and the like. He mentioned that Mr. Stevens, of Washington, D. C., was planning to use the lightning storm occurrence maps prepared by the Experiment Station to study the weather conditions responsible for the occurrence of lightning storms.

Mr. Brundage said that studies should be made of the fire hazard existing in the blow-down areas resulting from the wind storm last spring. After some discussion as to whether this was properly a major research project, it was decided to assign this problem as an administrative study to several forests and to ask the Office of Plant Pathology to cooperate with these forests when studies were made of the decay factor in the reduction of fire hazard.

Forest Economics

Forest Survey of Oregon and Washington - The forest survey has been under way a little over two and a quarter years. The inventory phase is now at the point where it can be definitely stated that all

field work will be completed by the fall of 1932 unless serious losses in personnel occur. As of March 1932, field work on all west side National Forests has been completed with the exception of 299,000 acres on the Siuslaw, 98,000 acres on the Mt. Baker, and 391,000 acres on the Olympic. During the coming summer there will be one party working on the Mt. Baker, two or more parties on the Siuslaw, and at least two, and preferably three parties on the Olympic.

On the lands other than National Forests mapping in place has been completed for 10,900,000 acres, representing 19 counties. Mapping is now going on in 8 counties and is yet to be started in 11 others, totaling 7,711,000 acres. Check cruising has been done on 58,000 acres of land scattered through some 17 counties. Check cruisers are now working in 3 counties, with 18 counties yet to be started. There are now 6 men with 2 temporary assistants mapping in place, and 1 year-long check cruiser with 2 temporary assistant check cruisers at work. By April 1, 2 more assistants will be added to the mappers, 1 more permanent check cruiser will be in the field, and 2 or 3 more temporary check cruisers will be added, giving a total of 6 men mapping in place, 4 men assisting in mapping, 2 permanent men doing check cruising, 4 or 5 temporary men on check cruising, together with compassmen.

During the winter detailed working plans for the compilation and recapitulation of inventory data have been completed and the Columbia River Oregon Release Unit has been worked up, with the exception of parts of Clackamas and Hood River Counties, where field work is still in progress.

Office work on the 5 National Forests where field work has been completed is from 70 to 90 per cent done and will be completed by July 1, 1932. Office work on the 5 National Forests where field work will be

in progress during the coming summer will be completed during the winter of '32-'33. If the temporary office personnel situation is changed during the year so as to allow the employment of temporary office help during the winter of '32-'33, the office work on lands other than National Forests should be completed before July 1, 1933. If not, this work must be done entirely by the regular survey staff and the job will take until July 1, 1934 if no field work is done in the summer of 1933.

During the past year a comparison of methods, strip versus compilation, was completed in Lewis County, and the results obtained were such that a continuation of the compilation method was decided upon. As a result of this comparison of methods refinements in the compilation method were put into effect, resulting in a slight slowing up in the speed of the work.

On the growth phase a working plan has been prepared and has been accepted by the Washington office.

On the depletion phase basic principles have been agreed upon and tentative working plans have been set up. Procedure toward getting data on fire and cutting on the NationalForests for the past 10 years has been initiated. In the near future Johnson, of the Products staff, will start on the cutting depletion on lands other than National Forest.

The requirements phase is to be conducted largely by the Section of Forest Products. Lodewick will start on the work in the near future. In a conference at the time of Hallauer's visit it was decided to approach this phase from the standpoint of consumer needs and to do as much as possible through sample plotting typical urban and rural districts and representative secondary wood-using industries.

Andrews stated that the bulk of the allotment for survey work during the fiscal year 1933 must be spent in completing both field and office work in the Douglas fir region but that it seemed wise to have at least one man work east of the Cascade Range during the 1932 field season in order to try out the procedure as standardized for the Douglas fir region, and see if it fits east side conditions, and if not, what changes in procedure and type definitions are needed. One or two men experimenting there might be expected to run into most of the problems which the Survey would meet so that the instructions could be modified before the entire crew starts on this project a year later.

Mr. Kavanagh suggested that in his opinion an extensive grazing reconnaissance could be made by the Survey in conjunction with its forest inventory east of the Cascades with practically no additional cost and without interfering in any way with timber inventory procedure. The Committee was of the opinion that this proposal should be given consideration.

The Committee discussed the matter of changes in the present working plan but no concrete suggestions were made, except that the Survey draft a letter to the Forest Supervisors on the east side in which would be listed specific questions dealing with survey technic and that in answering this letter Forest Supervisors could mention all of the items which they would want the survey to cover. Upon receipt of these letters the Survey staff would have material on which to make tentative changes in the present working plans, these proposed changes to be verified by discussion in the field either with groups of east side supervisors, or by contact in the field with individual east side supervisors.

Extensive Revision of Forest Statistics - The national project of revising the statistics of the Copper Report has been completed so far as this forest region is concerned, and was therefore given no consideration by the Committee.

New Public Domain - Following up the forest survey, tax inquiry, forest insurance and management studies, the new public domain (abandoned land) project was initiated on March 1, 1938. Working plans and tabulation of available material are well under way. Several contacts have been made and the public appears to be in a receptive mood.

The work divides naturally into four major parts, namely, (1) status of delinquency, (2) use classification of delinquent lands, (3) type of desirable public ownership, and (4) management plans.

As a preliminary step in determining status of delinquency, a simple form is being devised to speedily, accurately and clearly transcribedfrom county records the following: areas where the county has taken tax deed; can take tax deed now; can take tax deed in one, two, three, four, and five years hence. The statistical data could later be mapped. Inasmuch as each of the 38 counties west of the Cascades in Oregon and Washington contains substantial forest areas, and inasmuch as the physical and economic factors are so widely varying, the committee felt that such a generalized survey supplemented by general basic rules widely applicable should be set up at any event. In the intensive phase, the committee felt that selection of the worst trouble spot in each county would be futile because of the (1) wide variance of conditions within counties, (2) cumulative effects, (3) problems of public finance and (4) broad influences of natural trade zones. The committee was unanimous in recommending that intensive studies should be conducted so as to bring out contrasts in

depleted operating and virgin zones, cumulative effects of abandonment, public finance problems and trade influences. Requests for intensive studies were reported as follows: east and west Lewis County, east and west Jefferson; Lincoln; Josephine; Douglas and Lane or Columbia and Douglas; Clallam, Jefferson, Grays Harbor, and Mason as a group and Clatsop, Tillamook, Columbia and Washington as another group.

It was emphasized that proper use classification of delinquent lands and of those that may go delinquent would depend largely upon available basic data. The paucity of soil and topographic surveys for the region was pointed out. The resource survey will show present use, which will serve as an indication. The Regional Office has certain studies within and contiguous to National Forest boundaries, and Forest Supervisors might go further in analyzing these areas.

The multiplicity of forms of national, state and local public ownership already existing in the area was shown to be a basis for study of desirable lines of ownership. Advantages of existing managed units of publicly owned lands as a foundation and the disadvantages of multiple forms were briefly considered. It was stated that the study had already pointed toward the need for some early remedial legislation.

Management plans were being developed through (1) experimental small tracts, (2) studies in selective logging and transportation, (3) various protection agency investigation, and (4) growth phases. The statement was several times repeated that there was need for a study to determine the minimum desirable area for economic management. The serious problem of many scattered, intermingled and different intent ownership was emphasized.

The committee felt that the work could not be satisfactorily completed by June 1933.

Development of Private Forestry - In order to determine the financial aspects and practicability of some modification of prevailing logging practice in the Douglas fir region, namely, through economic selection, time studies were made at 13 different operations involving some 30 million feet of logs during the past year. The results have been analyzed and make a splendid basis for comparing the cost of different types of logging for various conditions. They point strongly to the advantages, purely from the economic point of view, of smaller and more flexible types of equipment, such as can be used with group or single tree selection where costly, cumbersome, large machines cannot. This study also included analyses of several case areas to determine the practicability and financial aspects of economic selective logging. The results of these studies indicate a very great spread in conversion value of timber within typical properties. With clear cutting over large areas a considerable percentage of the timber is converted at an actual loss. It appears that with economic selective logging, even at a higher logging cost per thousand, the property could be exploited at a greater profit. Two reports on these studies, one dealing with the logging time studies, the other with the application of economic selective logging principles to specific tracts, are nearing completion. A subsidiary phase of this project was four mill scale studies made in cooperation with the West Coast Lumbermen's Association in order to determine the pond values of various types of logs. The results of these mill studies have been given to the industry.

It was explained to the Committee that it was of utmost importance that the results of these studies be put in the hands of those able to apply the results in the most vivid and effective fashion, and that in addition to various forms of publication, it was proposed to hold a series of seminars with leaders of the industry. The Committee felt that this study needed very much such a follow-up and that nothing should prevent that.

The Committee felt that similar studies in the ponderosa pine region were most important, both from the point of view of the national forests and the private operators in order to determine the economic aspects of selective cutting. Good mill studies are available, but there is a dearth of logging engineering information. It was decided that if Brandstrom could not extend this study to the pine region, that the Section of Products should put it in its program to do so.

Forest Products

The work of the Section of Products during the year was largely devoted to utilization, waste, and ponderosa pine milling studies, and to the study of breakage in logging in the Douglas fir region. The transfer of Mr. Gibbons to the Washington Office and the substitution of Dr. Lodewick in his place necessitated some break in continuity and certain changes in assignment. The investigations formerly assigned to Spelman were transferred to and carried through by Rapraeger.

Logging and Milling Studies - Time and mill scale studies in the Douglas fir region (formerly Project L-260 (R-6). As part of the project "Development of Private Forestry", four mill scale studies in Puget Sound mills were conducted cooperatively with the West Coast Lumbermen's Association, but otherwise nothing was done on this project

and it was not the initial intention to do anything further because of the unsettled conditions in the industry and the probability that mill procedure was not normal. The Committee expressed considerable desire that more Douglas fir mill scale studies be made, particularly in Oregon mills. It was thought that a search should be made to find mills which were cutting fairly normally where this study might be carried on. The Committee voted that such studies should be given priority over all except the continuous projects of the section.

Lumber manufacture in the ponderosa pine region of Oregon (formerly Project L-260 (R-6) 4). It was reported last year that some material contained in the field data of the Shevlin-Hixon and Mt. Emily mill scale studies needed to be put into report form. This has been done by Mr. Rapraeger, who completed a report on the Mt. Emily mill scale study, and a second report combining the log data from the two mills. Though additional mill scale studies might be made in the ponderosa pine region, these seem less needed at present than do other phases of products investigations.

The need for a mill scale study in the small mills of the Douglas fir region was presented to the Committee. The amount of lumber produced by these small units is increasing annually, and the economics of their operation should be investigated. The opinion of the Committee was that this study was not important enough to warrant more than fourth place in priority.

The advisability of conducting a study of the economics of motor truck logging in the region was presented to the Committee. The discussion indicated that such a project would provide data

needed by Forest Management, and might well be a study which could be carried on continuously in order to record changes in the casts of this increasingly important form of log transportation. It was brought out at the meeting that some 200 million feet of logs were dumped into Puget Sound alone from motor trucks every year. The Committee favored placing this project third in priority.

The discussion at the meeting brought out the fact that the selective logging studies in the ponderosa pine region should be carried on by economics or products. Such studies are necessary there in order to make the most of the ponderosa pine milling data already at hand. It was proposed that the Section of Products add such a study to its list, to be rated second in priority, and to be undertaken in collaboration with Brandstrom in the event of his assignment to the project, and independently of him if he does not remain in the region.

Species Utilization - Under this new alignment are included all former projects on the utilization of little used species in the region. The report "Utilization of Bigleaf Maple of the Pacific Northwest", completed in 1939, by Johnson is in the hands of the Government printers. Johnson has done considerable work on Oregon white oak and expects to complete this study during the fiscal year 1953. Some work has also been done on black cottonwood. The Office of Forest Management is studying the silviculture and management of this species, and the two reports might well be combined in one bulletin as was suggested in 1951. It is recommended that this project be continued in order to collect such information as is available on all the minor hardwood and softwood species of the region.

Woods and Mill Utilization - A general survey of mill waste in the sawmills of the Douglas fir region. Formerly Project L-260 (R-6) 2. This project was reported on rather fully at the Regional Investigative Committee meeting in 1931. This inventory was completed by publication of the report in the Timberman.

Felling and Bucking in the Douglas Fir Region. Formerly Project L-260 (R-6) 3. During the past year the time study phase was completed and a report published in the West Coast Lumberman. Field work on the breakage phase was conducted during the past summer, and the report will be completed by April 1932.

A new phase of the project was proposed as the reduction and utilization of sawmill waste in the Douglas fir region. This is a combination and enlargement of the projects designated last year as L-260 (R-6) 6 and L-260 (R-6) 7, and is a follow-up of Hodgson's survey of woods and mill waste. It should be carried on as more or less separate investigations of possible means of reducing sawmill waste, present and more profitable outlets for unavoidable waste, and other phases of increased waste utilization. This should be undertaken only if and when time and opportunities present themselves.

Statistics of Forest Products - The statistical studies of log, lumber, shingle and minor products production and prices have been combined under this heading.

The study of the industries producing minor timber products which was begun last year by Johnson has been completed and the report sent to the Forester. No arrangements for publication have been made aside from a ten-page digest in "Forest Research Notes." This has received very favorable comment together with requests for

additional copies. Since these so-called minor products have a value of $16,500,000 annually they are important enough to warrant further study. It is suggested that the collection of these statistics be made continuous and that the scope be enlarged to include ferns, greens, bark, oils and other products of the forest. No action was taken by the Committee.

The annual lumber, lath, shingle, and log census in cooperation with the Bureau of the Census has been carried on as usual. The collection of lumber, log, and shingle prices has been continued and enlarged to include the recapitulation of Douglas fir and hemlock prices formerly made by the office of Forest Management. A proposal to assume the quarterly and annual summaries of ponderosa pine prices for six districts was temporarily abandoned because of inability to put through an enlarged agreement with the associations.

Special studies - A study designed to give a cross section of present dry kiln practice in the Douglas fir region was proposed for the ensuing fiscal year. This project has the support of the Forest Products Laboratory and would provide information of value to them to kiln manufacturers, and to lumber manufacturers. The Committee was of the opinion that such a study might well be placed well down on the list, and undertaken only if other projects failed to materialize.

The requirements phase and cutting depletion phase of the forest survey will be handled largely by the Section of Forest products. Present plans provide that several months of Johnson's time be devoted to the depletion phase, and that the major portion of Lodewick's time be given over to the requirements phase.

Forest Insurance Study - The direct research on insurance

rate determination has gone as far as it can without figures indicating total existing amounts of the several forest types. Since the forest survey of the Douglas fir region will give such figures that will be far superior to any others, it will be advisable to wait until these become available.

The figures compiled by the insurance study itself include indications of aggregate losses during the period 1921 to 1930 according to the elements of hazard necessary to recognize for rating purposes. This has involved analysis of losses under varying hazard conditions due to differences in physical conditions, varying exposures to general and specific causes, varying climatic conditions, and differences in the value of the protective effort in the various districts.

These figures are definitely encouraging in their indications of the possibilities of practical forest fire insurance. They indicate, for example, that in the whole Douglas fir region, during the decade 1921 to 1930 inclusive, the average annual loss of timber of merchantable size was only thirty-five one-hundredths of one percent on a volume basis. Assuming a unit value this means three and one half cents per one hundred dollars of value per year. This is evidence that the protection of merchantable timber has been brought to a high degree of effectiveness and that the major problem of protection in the region is now that of reducing losses in areas bearing young reproduction for which the showing is not so encouraging.

This figure for merchantable timber is " after salvage" which brings out another fact that has perhaps not been fully appreciated

before. That is that even though logging operations are responsible for a considerable number of fires and a corresponding amount of killed timber they compensate very largely by salvaging much of the burned material and thus greatly reduce the loss that might otherwise be chargeable to them.

The present activity on the study is being mainly directed toward an inquiry into forest valuation principles and practices in the region to determine their effects on possible insurance undertakings. Since this brings in considerations that may affect the whole trend of forest policy in the region which may modify or be modified by the introduction of insurance the spending of a considerable amount of time on this phase will be justified. It will also be desirable to do some educational work in appropriate places as opportunity is afforded in order that the way for insurance may be somewhat more smoothly paved.

In addition to this valuation and policy work which must be done before the project can be called completed in the region an inquiry must be made into the major conflagration hazard in order that proper allowance may be made in the schedule for this factor. No major conflagrations occurred during the ten year period studied and data must be gathered through a study of past history. Even though protection has definitely improved during recent years it is by no means certain that the danger of major conflagrations has been entirely eliminated.

Study will also have to be made during the coming year of the legal aspects of forest fire insurance in the two states, of policy and application forms, and some inquiry into the administra-

tive methods that might be applied.

It will very likely develop during the year that the inquiry has proceeded as far as it can go in the Douglas fir region until more complete figures are obtained by the survey. Since, however, it is planned that the study will be extended into the ponderosa pine region in any event, no great difficulty would be introduced by this expediency. It will be possible to fill in the time during which activity in the Douglas fir region is suspended with work in the ponderosa pine region.

PRIORITY RATINGS OF PROJECTS ASSIGNED TO EXPERIMENT STATION

Class of Activity and Project	Index of Priority*
Botany	
Phenology	A 3
Forestation	
F seed	A 3
F planting	A 3
Exotics	B 3
Management	
M Douglas fir	A 1
M Ponderosa pine	A 2
Mt. Douglas fir	B 3
Mt. Ponderosa pine	B 3
Mensuration	
ME Douglas fir	A 2
ME Ponderosa pine	B 1
ME Spruce-hemlock	C 1
Protection	
Pf Attack	B 1
Pf Behavior	B 1
Pf Damage	C 1
Forest Economics	
Survey	A 1
New Public Domain	B 1
Development of Private Forestry	A 1
Forest Products	
Logging and milling	B 1
Species utilization	B 2
Woods and mill utilization	B 1
Statistics	A 1
Special studies (Requirements Phase of Survey)	C 1
Forest Fire Cooperation	
Insurance	B 1

*Explanation of symbols for indices of priority:

A. Current work which can not possibly be discontinued for a year or more
   1. First rank of urgency
   2. Second rank of urgency
   3. Third rank of urgency

B. Current work which could be dropped for a year if necessary
   1. First rank of urgency
   2. Second rank of urgency
   3. Third rank of urgency

C. New projects
   1. First rank of urgency
   2. Second rank of urgency
   3. Third rank of urgency

ARTICLES, PUBLICATIONS, MANUSCRIPT REPORTS AND WRITTEN ADDRESSES
PREPARED BY THE EXPERIMENT STATION STAFF
FROM MARCH 1, 1931 TO MARCH 1, 1932
AND PUBLICATIONS PROPOSED FOR F.Y. 1933

H. J. Andrews

Prepared or Published in 1931

Adjustment or Check Cruising on the Forest Survey in the Douglas Fir Region. (For Department of Agriculture Yearbook)

The Forest Survey in the Douglas Fir Region. Paper for Annual Meeting of Society of American Foresters. Accepted for J. of F.

Proposed for 1933

Final Reports on Forest Survey by Survey staff.

W. H. Bolles

Prepared or Published in 1931

Memorandum Report on Field Work in Cowlitz County, Washington. (For Progress Report for Forest Survey)

The Forest Survey. (Idaho Forester, Vol. XIII, 1931)

Afield with a Forest Ranger. (American Forests, July 1931)

Descriptive Memoranda for Forest Survey Field Work and General Conditions in Clark County, Washington. (Ms.)

Descriptive Memoranda for Forest Survey Field Work and General Conditions in Wahkiakum County, Washington. (Ms.)

A. J. F. Brandstrom

Prepared or Published in 1931

Working Plan for a Study of Selective Logging as Applicable in the Douglas Fir Region. (Joint authorship with B. P. Kirkland. Ms.)

Economic Selection Logging. Address for meeting of Western Forestry and Conservation Association.

Logging Profitable Logs -- A Discussion of Economic Selection in Logging
Part I - Introduction by T. T. Munger
Part II - by A. J. F. Brandstrom
in West Coast Lumbermen's Loggers Daily, Oct. 31, 1951, and The Timberman's Logging Congress Special.

Proposed for 1933

Part I - Time and Cost Analysis of Logging Machinery and Methods in the Douglas Fir Region

Part II - The Application of Selective Logging Principles to Pacific Northwest Forests.

Both proposed for publication by the West Coast Lumbermen's Association.

E. D. Buell

Prepared or Published in 1951

Descriptive Memoranda of Forest Survey Field Work and General Conditions in Pacific County, Oregon. (Ms.)

Descriptive Memoranda of Forest Survey Field Work and General Conditions in Lewis County, Wash. (Ms.)

R. W. Cowlin

Prepared or Published in 1951

Problems in Type Mapping. (For Department of Agriculture Yearbook)

Sampling Douglas Fir Reproduction Stands by the Stocked Quadrat Method. (For Jour. of For.)

A. H. Hodgson

Prepared or Published in 1951

The Present Utilization of Sawmill Waste in the Douglas Fir Region. (The Timberman, July, Aug., Sept., Oct. 1951)

L. A. Isaac

Prepared or Published in 1931

Proposed Quinault Natural Area Representing the Spruce-Hemlock Type.

Proposed Wind River Experimental Forest - Trout Creek and Panther Creek Divisions.

Proposed Pringle Falls Experimental Forest, Representing the Ponderosa Pine Region. (Joint authorship with E. L. Kolbe)

Mortality of Douglas Fir Natural Reproduction and Environment under Which it Occurred.

First Progress Report of the Study of Factors Influencing Natural Reproduction in the Wind River Valley - Feb. 1, 1932.

Proposed for 1933

Physical Factors Influencing Douglas Fir Natural Reproduction. Approx. 50 pp. double spaced for J.A.R.

Rate of Natural Reforesting on Twenty Cut-over Areas in the Douglas Fir Region (For technical journal)

Cold Storage Prolongs Life of Noble Fir Seed (J. of F. or For. Worker)

Life of Douglas Fir Seed after Falling (Ecology or Jour. of Bot.)

H. M. Johnson

Prepared or Published in 1931

The Production and Consumption of Minor Timber Products in Oregon and Washington. (Ms.)

Utilization of Bigleaf Maple of the Pacific Northwest. (In press)

Proposed for 1933

The Economic Importance of Small Sawmills in the Douglas Fir Region. (For trade journal)

Utilization of Oregon White Oak of the Pacific Northwest. (For Dept. Bull.)

P. D. Kemp

Prepared or Published in 1931

Memorandum Report on Field Work in Linn County, Oregon. (Progress report for forest survey) (Ms.)

Descriptive Memoranda of Forest Survey Field Work and General Conditions in Southern Tillamook County, Oregon. (Ms.)

Descriptive Memoranda of Forest Survey Field Work and General Conditions in Lincoln County, Oregon. (Ms.)

E. L. Kolbe

Prepared or Published in 1931

Phenology an Instrument of Forest Administration. (Northwest Science, Sept. 1931)

Progress Report for the 15-year-old Methods of Cutting Plots on the Whitman National Forest (Ms.)

Proposed Pringle Falls Experimental Forest (Joint authorship with L. A. Isaac., Ms.)

Review of U.S.D.A. Tech. Bull. 159 - Slash Disposal in the Western Yellow Pine Forests of Oregon and Washington. (J. of F. April 1932)

Phenological Observations in the Douglas Fir Region. (1931 Progress Report, Ms.)

Regional Races of Ponderosa Pine. (1931 Prog. Report for Six Plantations, Ms.)

Proposed for 1933

Fifteen Years Growth Following Experimental Cutting on Three Plots in Ponderosa Pine (for J.A.R. or J. of F. Est. 35 ms. pages, double spaced with about 20 charts and tables).

The Application of Mill Scale Studies to Actual Stands as a Basis for the Comparison of Several Methods of Cutting in Ponderosa Pine from an Economic Standpoint (For a trade journal or Forest Research Notes. Est. 50 ms. pages double spaced with about 15 tables and charts. Joint authorship)

The Objectives of Marking Practice and How to Accomplish Them in Ponderosa Pine (For J. of F., est. 10 ms. pages double spaced).

The Wind River Arboretum - A report on the growth and survival of the conifers tested in the arboretum at the Wind River Branch Station. (Joint authorship with Thornton T. Munger for Tech. Jour., est. 20 ms. pages double spaced with about 5 charts and tables)

J. E. Lodewick

Prepared or Published in 1931

Sawmill "Waste" and Its Utilization in Scandinavia and the Pacific Northwest. (J. of F.)

Some Summerwood Percentage Relationships in the Southern Pines. (J. A. R.)

D. N. Matthews

Prepared or Published in 1931

Mapping Forest Cover Types from the Air. (West Coast Lumberman, Oct. 1931)

Proposed for 1933

The Appraisal of Forest Fire Damage. (40 ms. pages, double spaced, for Tech. Jour.)

The Measurement of Forest Fire Danger in the Pacific Northwest. (70 ms. pages, double spaced, for Tech. Jour.) Joint authorship with F. E. Beardie.

R. E. McArdle

Prepared or Published in 1931

The Relation of Mycorrhizae to Conifer Seedlings. (Accepted by J. A. R.)

Working Plan for Hour Control Study of Fire Reports and an accompanying memorandum. (Ms.)

Determining the Speed of Attack Necessary for Fire Control in Different Cover Types on the National Forests of Oregon and Washington. Address for meeting of Western Forestry and Conservation Association, 1931.

A Bark Blazer for Marking Trees. (For Jour. of For.)

Hour Control Analyses for Eastern Oregon National Forests (Tables and Charts, Ms.)

Hour Control Analyses for Eastern Washington National Forests (Tables and Charts, Ms.)

The Height, Condition and Number of Douglas Fir Snags per Acre at Different Periods Following Fires. (Ms.)

Proposed for 1932

Progress Report on Slash Disposal in the Douglas Fir Region. (80 ms. pages, double spaced, for J. A. R.)

The Spread of Forest Fires as Influenced by Various Weather Factors, Topography and Fuel Conditions. (40 ms. pages, double spaced, for Monthly Weather Review)

The Measurement of Forest Fire Danger in the Pacific Northwest. (70 ms. pages, double spaced, for Monthly Weath. Rev. joint authorship with D. N. Matthews)

Speed of Attack in Fire Control on the National Forests of Wash. and Ore. (150 ms. pages, double spaced for Dept. Bull. Joint authorship with F. H. Brundage)

The Occurrence of Lightning Storms on the National Forests of Ore. and Wash. 1915-1931. (60 ms. pages, double spaced. Joint authorship with L. C. Morris, for Monthly Weather Review)

Measuring the Effective Visibility Range from Lookout Points. (15 ms. pages, double spaced, for Monthly Weather Review)

W. H. Meyer

Prepared or published in 1931

Preliminary growth alinement charts for selectively cut stands of western yellow pine. Forest Research Notes No. 6.

Thinning experiments in young Douglas fir Jour. of Agric. Research Sept. 15, 1931.

Effect of release upon the form and volume of western yellow pine. Journal of Forestry Dec. 1931.

Abstracts of certain phases of European literature in the field of forest Mensuration. (Mimeographed)

First report on the Mt. Hood permanent sample plots in even-aged Douglas fir. (Ms.)

First report on the Wenoga Butte permanent sample plots in even-aged western yellow pine (Ms.)

Report on the 1930 remeasurements of the Cascade permanent sample plots in second-growth Douglas fir. (Ms.)

Bark thickness and bark volume of western yellow pine (Ms.)

Office report on the basic data for the growth and yield study in western yellow pine. (Ms.)

Seedling growth of western yellow pine. (Ms.)

Effect of release upon height growth and upon the shape of the height curve. (Ms.)

Mortality in selectively cut stands of western yellow pine (Ms.)

Relation of volume growth to tree class in western yellow pine (Ms.)

Proposed for 1932

Interregional volume tables for mature Douglas fir. 14 tables, 7 charts, 6 pages of text. (To be mimeographed)

Growth of selectively cut stands of ponderosa pine. 20 tables, 15 charts, 40 pages of text. (Bulletin)

Tests of Douglas fir yield tables by 10 years of measurements on permanent sample plots. 12 tables, 5 charts, 20 pages of text. (For a trade journal)

Cyclic variations in the diameter growth of mature ponderosa pine in Oregon and Washington. 6 tables, 6 charts, 10 pages of text. (For a technical journal)

F. L. Moravets

Prepared or Published in 1931

Descriptive Memoranda for Forest Survey Field Work and General Conditions in Whatcom County, Washington (Ms.)

W. G. Morris

Proposed for 1933

A Comparison of Several Geographic Forms of Douglas Fir in the Pacific Northwest. (For J. A. R., est. 15 ms. pages double spaced with about a dozen large tables. Joint authorship with T. T. Munger)

The Occurrence of Lightning Storms on the National Forests of Oregon and Washington, 1925-1931. (60 ms. pages double spaced for Monthly Weather Review. Joint authorship with R. E. McArdle)

T. T. Munger

Prepared or Published in 1931

Statement for the Forest Research Council Concerning the Work of the Pacific Northwest Forest Experiment Station for 1930 and Plans for 1931 (Ms.)

Logging Profitable Logs - A Discussion of Economic Selection in Logging.
Part I - Introduction by T. T. Munger
(West Coast Lumbermen's Loggers Daily, Oct. 21, 1931 and The Timberman's Logging Congress Special, Ms.)

Practical Application of Silviculture to Overmature Stands Now Existing in the Pacific Douglas Fir Region. (Ms.)

The Need for Research in Forestry Practice - (Paper for the Washington State Forestry Conference, Dec. 1931)

Slash Disposal in the Western Yellow Pine Forests of Oregon and Washington. U.S.D.A. Tech. Bull. 159 (Joint authorship with R. H. Westveld)

Proposed for 1933

A Comparison of Several Geographic Forms of Douglas Fir in the Pacific Northwest (For J. A. R., est. 50 ms. pages double spaced with about a dozen large tables. Joint authorship with W. G. Morris)

The Wind River Arboretum - A Progress Report giving the growth and survival of the conifers, tested in the arboretum at the Wind River Branch Station (Joint authorship with E. L. Kolbe, for Tech. Jour.)

E. F. Rapraeger

Prepared or Published in 1931

The Effect of Tree and Log Size on Felling and Bucking Costs in the Douglas Fir Region. (In joint authorship with H. R. Spelman, West Coast Lumberman, Dec. 1931)

Report on Mt. Emily Lumber Company Western Yellow Pine Mill Scale Study. (Ms.)

The Relation of Ponderosa Pine Log Size and Quality to Lumber Grades and Conversion Values. (61 ms. pages)

The Iniquitous Board Foot in Scaling. (The Timberman, March 1932)

Proposed for 1933

Breakage Losses in Felling Douglas Fir (30 ms. pages, for trade journal)

Log Scaling in the Douglas Fir Region (25-30 ms. pages, for mimeographing)

H. B. Shepard

Prepared or Published in 1931

The Influence of Local Climate on Forest Fire Hazard in the Douglas Fir Region (Mimeo. 6 charts)

Working plans for several phases of Forest Insurance Study (Ms.)

The Current Forest Insurance Investigation. (Paper at Western Forestry & Conservation Association meeting, 1931)

A. G. Simson

Prepared or Published in 1931

Climatological Data 1911-1930, Wind River Station, Washington (Ms.)

The Effect of Relative Humidity on Short-Period Fluctuations in Fuel Moisture Content (Ms. for J. A. R.)

Weather and Fuel Relationships at the Wind River Branch Station (Ms.)

REPORT OF FOREST INSECT FIELD STATION OF PORTLAND, OREGON FOR FISCAL YEAR 1938 AND PROGRAM FOR FISCAL YEAR 1939

The major functions of the office of forest entomology are (1) research work to determine better methods of controlling destructive forest insect outbreaks and (2) cooperation with the forest land managing agencies in making insect surveys and supervising the application of control methods.

During the past year noteworthy progress has been made on several major research projects. A three year study of the importance of slash breeding insects in ponderosa pine logging operations and the effect of such operations on the general barkbeetle situation in the vicinity of a logging area is now nearing completion and two of the final reports have been prepared. This study gives a sounder basis for conclusions as to the entomological aspects of slash disposal than has existed from general observations of the past. A large scale airplane dusting operation for the control of the hemlock looper gave valuable data as to the possibilities of using this method in controlling outbreaks of forest defoliators, and a detailed study of this outbreak has materially advanced our knowledge of the habits of this coast defoliator. Other research work included an extension of the ponderosa pine barkbeetle surveys; further data on western pine beetle control, the effect of climatic factors in barkbeetle outbreaks and a start on the study of important insect enemies of Sitka spruce.

For the coming year, in view of the small chance for increases in research funds, no new projects are contemplated and the resources of the station must be concentrated upon going projects having the highest degree of priority. The following three projects have been selected, as of greatest value.

(1) Barkbeetle Epidemics and Climatic Factors

This project will be given first consideration on account of the importance of determining the fundamental causes of western pine beetle outbreaks and the relation of climatic and silvicultural practices. The check surveys of the sample plots under operation for the past ten years, which had to be slighted last year, will be resumed again this year with the objective of bringing the records up to date. The cooperation with the Forest Service during the fall of the year in cruising representative plots throughout the ponderosa pine region will be extended, if possible, to two additional east side forests - the Wenatchee and Fremont. Without additions to the station's personnel, it is doubtful if this work can be extended to include all of the east side forests, even though this might be desirable from a number of standpoints.

One new phase of this project which is worthy of consideration is a more detailed analysis of the cause of barkbeetle losses on cut-over lands. Work in California on some Forest Service sale areas showed that following cutting, a high percent of the reserve stand may be killed by insects. A heavy loss from insects completely upsets the objectives of forest management policies as applied to such stands. In view of such possibilities, it would seem that a study of the insect losses on different types of cutting might yield valuable information on methods of reducing or eliminating this danger to reserve stands. Such a study could very well be tied in with the "Methods of Cutting" studies now being conducted by the Experiment stations, by extending the entomological plot studies to include those used for growth measurements.

The value of these barkbeetle surveys is becoming increasingly evident as the data secured from them is used in connection with growth and yield studies, the forest drain phase of the national forest resource survey, forest management plans as well as a determination of the possibilities of predicting insect outbreaks.

It is especially important that the plots be cruised this year and a stand inventory taken to determine net loss or gain over the last ten years. Data of inestimable value to the forest survey can only be obtained in this way.

(2) Coniferous Defoliators of the Pacific Northwest

A recent outbreak of the hemlock looper in southwestern Washington has already killed 162 million board feet of timber in the spruce hemlock type and may add some additional damage during the coming year. Last summer State and private timber owners spent about $15,000 in controlling the outbreak through airplane dusting.

There are many phases of this work which will require study during the coming year in order that we may profit from this experience in learning more of the habits of this insect and methods of improving control. A continuation of the studies started last year is planned with particular reference to the operation of natural control factors, the value of parasites and predators and the influence of weather conditions. If some method of predicting these outbreaks could be discovered, it would be of great value in lessening the cost and improving the chances for successful control.

(3) Insect Enemies of Sitka Spruce

Insect damage to Sitka spruce is of real economic concern in the protection of this important coast tree. A study of the insects

responsible for such damage and the possibility of controlling them, will be given as much attention as time and funds will permit. The green spruce aphis is probably the most serious offender and there is much to be learned about its habits and causes behind its activities.

Cooperative Services

Advisory service to forest land managing agencies for the coming year will involve supervision of control work on Crater Lake National Park and subsequent check surveys to determine results; surveys of insect conditions in Mount Rainier National Park; inspection of proposed National Forest control projects and such assistance to private timber owners as we may be called upon to render. It is estimated that approximately one fourth of the time of the station personnel will be devoted to these cooperative activities.

Discussion

The discussion which followed centered around the proposal of the Supervisors to carry out an experimental control project to test out the possibility of preventing epidemics through annual removal of endemic infestation.

Mr. Keen stated that maintenance control had been very thoroughly tested in California on the San Joaquin project and found of little value during conditions of static of declining infestation; neither did treatment of a small percentage of the infestation show much effect. The only possibility for success in maintenance control was in the application of control work at the very start of an upward trend in the infestation cycle and then to attempt as near 100 per cent removal of the infestation as possible. But in order to know when an epidemic might start, a more thorough knowledge of the basic

causative factors was necessary and it was here that the barkbeetle surveys were so important in helping to solve this problem.

Mr. Jaenicke stated that there was real interest on the part of timber owners as well as Forest officers as to the feasibility of preventing destructive epidemics by the western pine beetle by whittling away at the endemic infestations. In fact, there has been some insistence by timber owners that pine beetle protection of this kind in the intermingled private and Federal ownerships be tried out. There is a general feeling that the results of the California experiment may not have direct applicability to Oregon conditions. Jaenicke believed that the actual carrying out of such control work might yield data of research value in addition to indicating whether the handling of endemic infestations was possible. Mr. Keen stated that such a project might be of value provided it was planned to develop some of the more promising leads uncovered in past control work, but could see little value in simply duplicating what had been done many times before.

The Committee expressed itself as endorsing the suggestion of the Supervisors and recommended that a maintenance control project be started provided funds and a suitable area could be found and that the most promising leads developed by the Bureau of Entomology would be tested.

Priority of Projects

The going projects of the forest insect station are listed below in the order of their importance:

	Project	Status
1.	Barkbeetle Epidemics and relationship to Climatic and Silvicultural Factors	To be expanded on two more east side forest.
2.	Barkbeetle control	Final report on western pine beetle studies due in 1933
3.	Coniferous Defoliators of the Pacific Northwest.	Work to be increased
4.	Insect Enemies of Sitka Spruce	To be started this year.

Estimates For Forest Entomology Program

Fiscal years 1932-1933

	Appropriation F. Y. 1932	Estimated needs F. Y. 1933
General Administration		
General Entomology	$ 500	$ 500
Extension	500	500
Equipment Investment	1000	500
Research Projects		
Logging and slash studies	3000	500
Barkbeetle Surveys	1200	3800
" Control Studies	300	600
hemlock looper	1100	1500
Sitka Spruce insects	800	2100
Cooperative Control Services		
National Park cooperation		
Crater Lake Park	1550	1200
Mt. Rainier	250	800
National Forest Surveys	250	500
Private owners "	350	500
Total	$13000	$13000

Reports Prepared

F. P. Keen - "The Hemlock Looper Outbreak in Southwestern Washington and Its Control Through Airplane Dusting." Dec. 10, 1931

"Mountain Pine Beetle Situation in Crater Lake National Park and Surrounding Natural Forest Areas, Season 1931 and Recommendations For Control Spring 1932." Jan., 1932

J. A. Beal "Mountain Pine Beetle Situation in Rainier National Park Fall 1931." Jan., 1932

"Logging and the Western Pine Beetle". Jan., 1932

"The Effect of Ponderosa Pine Slash on Insect Abundance." Feb., 1932

REPORT OF THE FOREST PATHOLOGY FIELD STATION, B. P. I., FOR 1931

General Forest Pathology: Disease reconnaissance was carried out as usual in connection with travel and work on other projects. No serious disease outbreaks or new foreign diseases were noted within the region. Part of the time of one man was devoted to scouting for chestnut blight, with negative results. Eradication conducted by the State at Gunter, Oregon, about 15 miles southwest of Eugene, (the only northwestern locality in which this disease has been found), was apparently successful, as careful examination failed to disclose any signs of the blight in 1931.

No extension of drought injury, prevalent in many east-side localities during 1930, has been noted. Some of the injured trees are showing signs of recovery, which should be hastened by the abundant snowfall of the past winter.

Decay of Slash in the Douglas Fir Region: Field work was completed during 1931 and results will be available in the immediate future.

Decay in Ponderosa Pine Slash: No work has been done on this project since 1928. No further activity scheduled except cooperation with Experiment Station in follow-up of decay in relation to slash disposal on permanent plots.

Deterioration of Windthrown Timber: Several blowdown areas were examined in the Mt. Hood and Santiam National Forests, and two study plots were laid out in the ponderosa pine type of the Deschutes National Forest. West-side areas, including the 1921 blowdown on the Olympic Peninsula, will require little or no attention prior to 1933 or 1934, but because of the rapid deterioration to which down

ponderosa pine is subject, measurement of material on the two east-side study plots during the coming season appears highly desirable.

White Pine Blister Rust: The year 1931 was found to be relatively unfavorable for long-distance spread of the rust from pines to Ribes. Only in very few instances was the rust found on Ribes except in the immediate vicinity of infected pines. A large number of new pine infection centers were found in Idaho. The rust is now known to be established on western white pine in that State over practically the entire range of the tree. No southward extension of the range of the rust on pines in Oregon was noted. The rust has not been found on sugar pine, neither has it ever been found on any species of white pine or on Ribes in California.

Continued susceptibility studies in British Columbia have substantiated previous evidence that sugar pine is highly susceptible, and that the two principal Ribes associates of sugar pine in its main commercial range are also highly susceptible to the rust.

Studies were continued of the capacity of prickly and sticky currants, the two main Ribes of the timber-type in commercial western white pine, to spread infection to pines. Results secured this year substantiated those secured in 1930, and strongly indicated that these Ribes have a considerably greater capacity to spread infection to pines than had been anticipated. Consequently, control, which was being centered in the eradication of other Ribes species in the stream-type, will have to be speeded up and applied to all of the commercial white-pine area.

Nursery Disease Control: Practical application of 1929 and 1930 results by the nursery personnel has given good control of

damping-off in all except fall-sown, high-altitude Douglas fir beds. No further work scheduled by this office except cooperation with Forest Management as needed.

Discussion by Investigative Committee

The program of the office was approved by the committee. Mr. Brundage, of Fire Control, stated that they felt the need of information regarding the length of time the recent (1931) blowdowns were likely to remain high fire hazards. The sentiment of the committee was that the cooperation of this office in securing such information would be desirable.

Because of the general financial situation, no action was taken regarding the desired study of deterioration of fire-killed Douglas fir, which was proposed by the committee a year ago as a joint problem for entomology, products, and pathology.

It will be necessary for this office to cooperate in the depletion phase of the Forest Resource Survey.

REPORT ON STUDIES BY FOREST PERSONNEL
Region 6

A Review of the 1931 Forest Studies,
and Assignments for 1932 as Approved by the
Regional Research Committee, March 16, 1931

This review of studies by forest personnel covers the investigations listed "Report on Studies by Forest Personnel", on pages 89 to 95 inclusive of the Annual Report for 1930 and Program for 1931, of the Regional Investigative Committee, together with assignments for 1932. After each study is shown in parentheses the Branch responsible for initiating action and for providing the necessary supervision, contact, and follow-up.

In the set-up of these Forest studies, such as carried on by the Forest personnel, the projects are placed into two classes:

1. Sub-Assignments of Major Projects, which are major studies under the Branch of Research or a Regional branch having certain phases being worked out by Forest personnel, or on which aid is furnished by Forest personnel on these major projects under the immediate direction of one or another of these branches.

2. Administrative Studies, such as discussed in the report of the Regional Foresters' Conference and the Forester's comments thereon, held at Washington, D. C., March 17 to April 9, 1930, which are defined in this report as:

"a. Projects of purely local nature involving the application of the results of research.

"b. Projects of purely local nature involving readily determinable facts necessary to immediate application in administration.

"c. Projects of local nature the results of which may be

applicable Service-wide or to forest regions and which cannot be undertaken by Research for some years."

Sub-Assignments of Major Projects

Note: These studies are described under their appropriate headings in the discussions pertaining to the major projects. Those starred (*) have not been previously listed in this program.

1. Methods of Cutting Ponderosa Pine (EXP)

   Assigned to Crater, Deschutes, Fremont, Malheur, Wallowa* and Whitman Forests.

2. Natural Reproduction, Douglas Fir Region (EXP)

   a. Germination and survival on different sites. Cascade, Columbia, Rainier, and Snoqualmie* Forests.

   b. Seed tree survival. Cascade, Mt. Baker, Mt. Hood, Olympic, Santiam, and Snoqualmie Forests.

3. Thinnings in Douglas Fir (EXP)

   Assigned to Cascade, Olympic, and Siuslaw Forests.

4. Thinnings in Ponderosa Pine (EXP, FM)

   Assigned to Chelan, Fremont, Malheur, Ochoco, Umatilla, and Whitman Forests.

5. Phenological Observations (EXP)

   All Forests in North Pacific Region.

6. Planting and Seeding (FM)

   a. Sites suitable for noble and silver fir. Mt. Hood and Rainier Forests.

   b. Ponderosa pine planting. Crater, Fremont*, and Umpqua Forests.

   c. Direct seeding in fog belt with small-seeded species. Olympic Forest. (EXP)

   d. Alder strips for firebreaks on cut-over areas. Olympic Forest.

   e. Effect of site and brush cover on survival. Columbia and Rainier Forests.

   f. Damage to plantations by animal trampling and cropping. Olympic and Rainier Forests.

g. Season of planting. Umpqua Forest.

7. Adaptability of Exotics and of Native Species Outside Their Natural Ranges (FM)

Columbia, Deschutes, Olympic, Rainier, and Siuslaw Forests.

8. General Nursery Practice (FM)

a. Nursery practice for species in North Pacific Region. Columbia, Olympic, Rainier, and Siuslaw* Forests.

9. Reporting and Charting Lightning Storms (EXP)

Assigned to all Forests in the North Pacific Region.

10. Forest Resource Survey of North Pacific Region (EXP)

Assigned to Columbia, Crater, Mt. Baker, Mt. Hood, Olympic, Santiam, Siuslaw, and Snoqualmie Forests, and to one or two representative Forests east of the Cascade summit.

11. Climatic Factors in Relation to Bark Beetle Epidemics (ENT)

Chelan, Colville, Deschutes, Fremont*, Malheur, and Wenatchee* Forests.

Administrative Studies

A. Review of Assignments for 1931 and Status for 1932.

1. Cascara (FM)

Assigned to Siuslaw Forest. Field work completed and report prepared jointly by Wilcox and Prof. T. J. Starker, Oregon State College. Published in American Journal of Pharmacy Vol. 103, No.'s 2 and 3, Feb. and Mar., 1931. Study closed.

2. Port Orford Cedar (FM)

Assigned to Umpqua and Siskiyou. Considerable mensurational and silvical data obtained by Matthews and Jackson, but due to transfer of former to Resource Survey, progress on this study has been somewhat held up. Further observations on silvical, cutting, and slash disposal phases desired before report is prepared. Continued on both Forests for 1932.

3. Alaska Cedar (FM)

Assigned to Mt. Baker, Mt. Hood, Olympic, Rainier, and Snoqualmie. A mapping of the location and approximate areas of stands of Alaska cedar by men on the Resource Survey, as incidental work. Continued for completion in 1932.

4. Cottonwood Study (FM)

Assigned to Cascade, Columbia, Mt. Baker, Mt. Hood, Olympic, Rainier, Santiam, Siuslaw, Snoqualmie. Mapping of location and area of cottonwood stands in connection with Resource Survey. Reports received in 1931 from Cascade, Columbia, Santiam, and Snoqualmie, and assignment completed on these Forests. Continued on other Forests for 1932.

5. Ponderosa Pine Volume Table Check (FM)

Assigned to Chelan and Wenatchee. A tree volume check against the Site IV ponderosa pine volume table as used in Region 6. Some work done in 1931, but not sufficient trees measured to serve as check. Continued on both Forests in 1932.

6. Partial Slash Disposal in Ponderosa Pine Region (FC, FM)

Assigned to Malheur, Rainier, and Wenatchee in 1931. A study of partial slash disposal as to methods, costs, etc., for cutting operations on private and National Forest lands. Considerable work done by Malheur and Fremont Forests and reports received. Continued on same Forests and additional assignment to Deschutes for 1932.

7. Swamper Burning in Ponderosa Pine (FM)

Study assigned to Colville, Deschutes, Fremont, Wallowa, Whitman, and Malheur Forests. This method of slash disposal is now considered as a standard practice wherever conditions are suitable. Discontinued as an administrative study in the future.

8. Natural Reproduction, Ponderosa Pine (FM)

Assigned to Wallowa Forest. Examination made in 1931 on seedling survival and slash deterioration. Results to date show practically no reproduction established since 1925. Report prepared for 1931. Transferred as sub-assignment of the study of "Methods of Cutting in the Ponderosa Pine Region".

9. Natural Reproduction, Douglas Fir (FM)

Assigned to Snoqualmie and Columbia Forests. Progress reports prepared for 1931 on both Forests. Continued indefinitely. Transferred as a sub-assignment of the study of "Natural Reproduction in the Douglas Fir Region".

10. Thinning Sapling Lodgepole Pine (FM)

Assigned to Wallowa and Whitman Forests. Two plots thinned on Wallowa in 1928. Data compiled and progress reports prepared. Area selected on Whitman and planned to thin in 1932.

11. Thinning Sapling Larch, Douglas Fir (FM)

Assigned to Colville Forest. Plots thinned in 1931 and progress report prepared.

12. Afforestation of Treeless Areas (FM)

Assigned to Wenatchee for a study of the possible afforestation of treeless areas. Annual examinations made of planted stock. New plantings will be made when climatic conditions are more favorable.

13. Fire Damage to Burned Timber (FC)

Assigned to Olympic. Study of fire damage to timber burned in 1927. Plot established and annual reports as to condition of trees and mortality by species made. Continued indefinitely. Assignments will be made to other Forests as fires occur. Transferred as a sub-assignment of the study of "Fire Damage".

14. Disposal of Port Orford Cedar Slash (FC)

Assigned to Umpqua and Siskiyou in 1931. Considerable work done by Umpqua and Regional Office personnel, and office memoranda prepared. Continued on Umpqua and discontinued on Siskiyou for 1932.

15. Visibility of Class A Smokes (FC)

Assigned to Cascade, Chelan, Columbia, Colville, Crater, Deschutes, Fremont, Mt. Hood, Umatilla. Discontinued as an administrative study for 1932. Work started on various Forests by Experiment Station in 1931. Will be continued in 1932 by the Exp. Sta., with sub-assignments to Deschutes and Ochoco.

16. Eliminating Hazards in Moss and Insect-killed Timber by Winter Burning (FC)

Assigned to Fremont and Ochoco in 1931. Considerable work done, and report prepared by Fremont. Additional assignment to Deschutes.

17. Grazing Management of Cut-Over Areas (RM, FM)

Assigned to Crater, Siskiyou, and Wenatchee Forests. Examination made as to plant successional phases and reproduction only on Wenatchee in 1931. Continued in 1932.

18. Plant Succession Studies (RM)

A grouping of five studies of plant succession on comparable grazed and protected plots on which concrete observations are being made. This general subject is divided into the following phases:

a. Seasons of Grazing: A permanent assignment to all important grazing Forests in 1931. Discontinued on all others except Fremont, Ochoco, and Wallowa in 1932.

b. Mountain Meadows (deferred use): Assigned to Cascade, Mt. Baker, Mt. Hood, Snoqualmie, Umpqua. This is a study bearing upon grazing use where recreational interests may conflict either at present or in the future. Discontinued on Mt. Hood for 1938. Continued on other Forests indefinitely.

c. Gopher-controlled Areas: Assigned to Ochoco in cooperation with Biological Survey. Approx. 35,500 acres poisoned in 1931. Continued indefinitely.

d. Erosion-controlled Areas: Assigned to Fremont and Ochoco. A study of brush and other control measures of meadow erosion and observations of plant succession on recovered areas. Reports prepared. Total of 32 dams constructed on Ochoco. Continued on same Forests in 1932.

e. Burned Timber Areas: Assigned to Umatilla. A study of plant succession on a burned-over area to study (1) forest regeneration, (2) reduction of range by fire, (3) length of period of effect of fire on regeneration and forage. Area examined annually. Continued indefinitely.

19. Sheep Trucking vs. Trailing (RM)

To Chelan, Malheur, Ochoco, Umatilla, Wenatchee, and Whitman. A study of the comparative costs and shrinkage of lambs trucked vs. trailing to market points. Continued on all above Forests except Umatilla, where sheep trucking is not practiced.

20. Range Reseeding on Burns and Denuded Areas (RM)

Assigned to Chelan. A study of grass seeding on denuded areas and burned areas as a means of restoring range.

21. Carrying Capacity of Ranges (RM)

Assigned to Wenatchee. Correlation of carrying capacity with actual use records.

22. Effect of Beaver Work on Range (RM)

Assigned to Ochoco in 1931. A study of range conditions as affected by beaver activities. Additional assignments to Fremont and Whitman.

23. Relation of Grazing to Plant Growth on Newly Grazed Area (RM)

Assigned to Deschutes Forest in 1931. No work done because no area found suitable, and discontinued for 1932.

24. Economics of Caterpillar Hauling (ER)

Columbia, Mt. Hood, and Olympic in 1931. Adaptability of caterpillar hauling of supplies in regions of difficult access, as compared to automobile or pack stock. Some work done on Olympic in 1931. Continued for 1932 for Mt. Hood and Olympic, discontinued on Columbia.

25. Truck Tire Study: Dual, Single Tandem (ER)

Assigned to Chelan, Crater, Olympic in 1931. A study of tire costs on Forest roads, according to whether used single, dual, or tandem fashion. Some general reports received. Discontinued for 1932.

26. Tree Removal Costs and Results by Pulling, Cutting, and Blasting (ER)

Assigned to Deschutes, Santiam, Siuslaw, and Umpqua Forests in 1931. A study to determine relative costs and effects of tree removal by these three methods under various conditions in Forest Road construction. Assignments for 1932 to be made later.

27. Way and Motor-Way Grades (O)

Assigned to Columbia, Crater, and Siskiyou Forests. Discontinued for 1932.

28. Use of Explosives (O)

Assigned to Columbia, Mt. Hood, and Rainier. A study of the classes of explosives and methods best adapted under various conditions of Forest road construction. Discontinued for 1932.

29. Rock Drilling Methods (O)

Assigned to Columbia, Crater, Mt. Hood, and Olympic. A determination of methods conducive to best results under various conditions. Discontinued in 1932.

B. New Administrative Studies Approved for 1932.

1. Douglas Fir Blowdown Study (FC)

Assigned to Mt. Hood. A study of fire hazard reduction in the 1931 blowdown area; causes, rate, etc.

2. Comparison of Stocked Quadrats and Visual Reproduction Mapping Methods (FM, L, EXP).

Assignments to be decided; one Douglas fir and one ponderosa pine Forest. Methods and results of mapping reproduction for forest-management and land-exchange purposes on cut-over lands in the Douglas fir and ponderosa pine regions.

3. Natural Reproduction, Western Red Cedar (FM)

Assigned to Colville. A study of natural regeneration conditions in stands of both virgin and cut-over western red cedar. This species is a high-value tree and a knowledge of regeneration is of great importance.

4. Trucking Feed to Sheep on Driveways (RM)

Assigned to Umatilla. Replacing last year's study of Sheep Trucking vs. Trailing. A determination of the practicability of trucking feed to stopping places on driveways for sheep.

5. Photographic Study of Specific Points (PR)

Assigned to limited number of Forests to be selected later. A photographic record of forest, range, and other development of specific points over a long period of years. It is possible that old photographs dating back to 1895-1900 may be useful in starting this record for certain areas. Also personal photographs by forest officers may be of value in this study.

6. Feasibility of Control of Normal Insect Infestations in Ponderosa Pine as a Preventative of Beetle Epidemics (FM, ENT)

Assigned to Fremont or Deschutes. Annual control of insect trees on a normally infested area isolated from other timber areas as compared to no control of normal infestations on a similar area for a comparison as to development of epidemic conditions in treated and untreated forests.

7. Target Visibility (FC)

Assigned to all Forests. Visibility of targets from lookout stations under various visibility conditions.

8. Protection Costs of Unburned Slash (FC)

Assigned to Colville, Crater, Deschutes, Olympic, Siuslaw, Snoqualmie, Umpqua, Whitman. A study of current protection costs on both public and private lands in the Douglas fir and ponderosa pine regions.

9. Snag Felling with Power Equipment (FC)

Assigned to Columbia, Mt. Hood, Rainier. A study of costs, application, and methods of felling snags with power equipment (machine drilling) for fire suppression or fire line construction.

10. Snag Disposal by Winter Burning (FC)

Assigned to Crater, Deschutes, Fremont, Wenatchee, Whitman. A study of methods, costs, feasibility, etc., of felling snags along roads, and in timbered and cut-over areas on both public and private lands by winter burning.

11. Snag Felling with 60-Cuts (FC)

Assigned to Deschutes, Malheur, Olympic, Methods, costs, and feasibility of felling snags on sale and other areas with tractors.

12. Snag Hazard Reduction by Natural Means (FC)

Assigned to Cascade, Columbia, Mt. Baker, Olympic, Santiam, Umpqua. Study of the rate of the elimination of snag hazard through windthrow, overtopping young growth, &c. on stocked burns, by means of sample plots.

13. Use of Killefer with 15-Cut (FC)

Assigned to Colville, Deschutes, Ochoco. Improvement in design and best method of use of Killefer plow with 15-Cut in fire line construction.

14. Equipment for Use with 60-Cut (FC)

Assigned to Deschutes. Development of equipment for fire line construction for use with 60 Cut.

15. Use and Speed of Killefer on Fire Line Construction. Project Fires (FC)

Assigned to Colville, Deschutes, Fremont, Whitman. A study of the conditions under which the Killefer is usable, speed obtainable, costs, etc., for fire line construction on project fires.

16. Use of Tractors for Mop-Up Work (FC)

Assigned to Deschutes, Fremont, Mt. Hood. Practicability of use on fires for turning logs, pushing down snags, etc.

17. Use of Horse and Plow for Fire Lines (FC)

Assigned to Chelan, Columbia, Colville, Crater, Mt. Hood, Rainier, Umpqua. Conditions under which use is possible, rates of construction under different conditions, etc.

18. Comparative Value of Hazel Hoe and Pulaski Tool (FC)

Assigned to Cascade, Chelan, Columbia, Mt. Baker, Mt. Hood, Olympic, Siuslaw, Wallowa, Wenatchee. Tests of above tools for fire-line construction for different timber types and surface conditions at guard training camps and on going fires.

19. Comparative Value of Hazel Hoe and Kortick Tool (FC)

Assigned to Crater, Malheur, Ochoco, Siskiyou, Umatilla, Whitman. Tests of above tools in ponderosa pine type and southwestern Oregon timber types at guard training camps and on going fires.

20. Headlights vs. Gasoline Lanterns (FC)

Assigned to Crater, Fremont, Malheur, Ochoco, Siskiyou, Umatilla, Wallowa, Wenatchee, Whitman. Effectiveness of headlights as compared to gasoline lanterns for night work on fire-line construction.

21. Speed of Fire Line Construction (FC)

Assigned to Forests as project fires occur. Comparative rates of speed of fire-line construction under different timber types and surface conditions.

22. Use of Pressure Drum Outfits (FC)

Assigned to Mt. Hood, Ochoco, Umatilla. Pressure drum outfits have certain advantages in fire control. It is desirable to develop technique in mop-up work; also the limitations of use, rate of use of water, etc.

23. Pressure Unit Development for Use with Pressure Drums (FC)

Assigned to Mt. Hood. The development, adaptation, and use of some sort of air compressor unit or light water pump for use with pressure drums for fire work.

24. Tests of Fire Hose (FC)

Assigned to Columbia, Mt. Hood, Rainier. A test of the various kinds of fire hose.

25. Use of the Cowan Couplings (FC)

Assigned to Mt. Baker, Olympic, Rainier, Snoqualmie. Use of the Cowan coupling under actual conditions for possible adoption in fire control work.

26. Storage of Fire Hose (FC)

Assigned to Columbia, Snoqualmie. A determination of the proper methods of storage and of handling facilities of rubber-lined hose, winter and summer.

27. Transportation of Hose on Fire Trucks (FC)

Assigned to Mt. Hood, Snoqualmie. Methods of storage and transportation of hose on fire truck to facilitate reduced attack time.

28. Development Plans for Water Use on High Hazard Areas (FC)

Assigned to Olympic, Snoqualmie. A study of specific areas of especially high fire hazard, such as old burns on highways, to facilitate the use of pumps and hose for fire-fighting purposes.

29. Snag-felling Equipment for Two-Man Outfits (FC)

Assigned to Columbia, Mt. Baker, Mt. Hood, Rainier. Trial in field of lighter felling equipment for two-man fire outfits for use in felling snags.

30. Extinguishing Fire in Standing Snags (FC)

Assigned to Cascade, Mt. Baker, Olympic, Rainier, Snoqualmie. A study of methods adaptable for extinguishing fires in snags without felling.

31. Fire Report Time Study (FC)

Assigned to Cascade, Chelan, Deschutes, Rainier, Siskiyou, Klamath, Umatilla. An analysis of elapsed time from the time of fire discovery to the time that fireman leaves for fire.

32. Emergency Fire Ration List (FC)

Assigned to Cascade, Mt. Baker, Mt. Hood, Umatilla, Umpqua, Wenatchee, Whitman. A check on the items in the emergency ration kits for lightning zones and man-caused fire zones.

33. Lightning Fire Time Analysis (FC)

Assigned to Cascade, Columbia, Crater, Malheur, Mt. Hood, Rainier. An analysis of the finding time of lightning fires, and the possibilities of reduction of the finding time.

34. Little Wenatchee Watershed Study (RC)

Assigned to Wenatchee. A broad study of watershed conditions in the Little Wenatchee River watershed (timber, topography, soil, grazing, etc.) as affecting water flow and watershed values.

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SUB-ASSIGNMENTS OF MAJOR PROJECTS - 1932

	PROJECT	Cascade	Chelan	Columbia	Colville	Crater	Deschutes	Fremont	Malheur	Mt. Baker	Mt. Hood	Ochoco	Olympic	Rainier	Santiam	Siskiyou	Siuslaw	Snoqualmie	Umatilla	Umpqua	Wallowa	Wenatchee	Whitman		
1	Methods of Cutting Ponderosa Pine					Exp	Exp	Exp	Exp												FM*		Exp		
2	Germ. & Surv. of Nat. Reprod. on Different Sites in D.Fir Region	Exp		Exp FM										Exp				FM*							
	Seed Tree Survival	Exp								Exp	Exp		Exp		Exp			Exp							
3	Thinnings, Douglas Fir	Exp											Exp				Exp								
4	Thinnings, Ponderosa Pine		Exp					Exp	Exp			Exp							Exp				FM* Exp		
5	Phenological Observations	Exp	Exp*	Exp	Exp*	Exp	Exp*	Exp*	Exp*	Exp	Exp	Exp*	Exp	Exp	Exp	Exp	Exp	Exp	Exp*	Exp	Exp*	Exp*	Exp*		
a	Sites suitable for Noble and Silver Fir										FM			FM											
b	Ponderosa Pine Planting					FM		FM*												FM					
c	Seeding in Fog Belt												Exp												
6 d	Planting Red Alder for Fire Breaks												FM												
e	Effect of Site and Brush Cover on Survival			FM										FM											
f	Damage to Plantations by Animal Trampling and Cropping												FM	FM											
g	Season of Planting																			FM					
7	Adaptability of Species			FM			FM						FM	FM			FM								
8	General Nursery Practice			FM									FM	FM			FM*								
9	Reporting and Charting Lightning Storms	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp		
10	Forest Resource Survey, Region 6			Exp		Exp				Exp	Exp		Exp		Exp		Exp	Exp	(East Side Forests as Selected*)						
11	Climatic Factors in Relation to Bark Beetle Epidemics		Ent		Ent		Ent	Ent*	Ent													Ent*			

*Assignments not previously listed
FM, Exp, Ent, etc. indicate Office or Branch responsible for Plan, Supervision and Follow-Up

AS
Supervision (1932)

PROGRAM OF ADMINISTRATIVE STUDIES - 1932

Sheet 1

Numbers correspond to those in the 1932 Report on Studies by Forest Personnel

	STUDIES UNDER WAY	Cascade	Chelan	Columbia	Colville	Crater	Deschutes	Fremont	Malheur	Mt. Baker	Mt. Hood	Ochoco	Olympic	Rainier	Santiam	Siskiyou	Siuslaw	Snoqualmie	Umatilla	Umpqua	Wallowa	Wenatchee	Whitman		
2	Silvical Study, Port Orford Cedar															FM				FM					
3	Range Study, Alaska Cedar									FM	FM		FM	FM				FM							
4	" " , Black Cottonwood									FM	FM		FM	FM			FM								
5	Ponderosa Pine Volume Table Check		FM																			FM			
6	Partial Slash Disposal in Ponderosa Pine Region							FC* FM	FC FM					FC FM								FC FM			
10	Thinnings, Sapling Lodgepole Pine																				FM		FM		
11	Thinnings, Sapling Larch-Douglas Fir				FM																				
12	Afforestation, Treeless Areas																					FM			
14	Port Orford Cedar Slash Disposal																			FC					
16	Hazard Elimination by Winter Burning						FC*	FC				FC													
17	Grazing on Cut-over Areas					RM FM										RM FM						RM FM			
Plant Succession	a. Seasons of Grazing							RM				RM									RM				
	b. Deferred Use of Mountain Meadows	RM								RM								RM		RM					
18	c. Gopher Controlled Areas											RM													
	d. Erosion Controlled Areas							RM				RM													
	e. Burned Timber - Areas																		RM						
19	Sheep Trucking vs. Trailing		RM						RM			RM										RM	RM		
20	Range Reseeding		RM																						
21	Carrying Capacity of Ranges																					RM			
22	Effect of Beaver Work on Range							RM*				RM											RM*		
24	Economics of Caterpillar Hauling										ER		ER												
26	Tree Removal by Pulling, Cutting, Blasting				(ER - Assignments to be made later)																				

*Assignments not previously listed

FM, RM, etc. indicate Regional Office Branch responsible for Plan, Supervision and Follow-Up

AS
Supervision (1932)

PROGRAM OF ADMINISTRATIVE STUDIES - 1932

Sheet 2

	NEW STUDIES	Cascade	Chelan	Columbia	Colville	Crater	Deschutes	Fremont	Malheur	Mt. Baker	Mt. Hood	Ochoco	Olympic	Rainier	Santiam	Siskiyou	Siuslaw	Snoqualmie	Umatilla	Umpqua	Wallowa	Wenatchee	Whitman		Study No.
1	Douglas Fir Blowdown Study										FC*														1
2	Check of Stocked Quad. Method on Reprod. Areas		(FM, L, Exp. - Assignments to be made later)																						2
3	Natural reproduction Western Red Cedar				FM																				3
4	Trucking Feed to Sheep on Driveways																		RM						4
5	Photographic Study of Specific Points		(PR - Assignments to be made later)																						5
6	Insect Control in Ponderosa Pine		(FM and Ent. - Deschutes or Fremont)																						6
7	Target Visibility	FC	FC	FC	FC	FC	FC	FC	FC	FC	FC	FC	FC	FC	FC	FC	FC	FC	FC	FC	FC	FC	FC		7
8	Protection Cost of Unburned Slash				FC	FC	FC						FC				FC	FC		FC			FC		8
9	Snag Felling with Power Equipment			FC							FC			FC											9
10	Snag Disposal by Winter Burning					FC	FC	FC														FC	FC		10
11	Snag Felling with 60-Cat.						FC		FC				FC												11
12	Snag Hazard Reduction by Natural Means	FC		FC						FC			FC		FC					FC					12
13	Use of Killifer with 15-Cat.				FC		FC					FC													13
14	Equipment for use with 60-Cat.						FC																		14
15	Use of Killifer on Fire Line Construction				FC		FC	FC															FC		15
16	Use of Tractors for Mop-Up Work						FC	FC			FC														16
17	Use of Horse and Plow for Fire Lines		FC	FC	FC	FC					FC			FC						FC					17
18	Hazel Hoe vs. Pulaski Tool	FC	FC	FC						FC	FC		FC				FC				FC	FC			18
19	Hazel Hoe vs. Kortick Tool					FC			FC			FC				FC			FC				FC		19
20	Headlights vs. Gasoline Lanterns					FC		FC	FC			FC				FC			FC		FC	FC	FC		20
21	Speed of Fire Line Construction				(FC - Assignments as Project Fires Occur)																				21
22	Use of Pressure Drum Outfits										FC	FC							FC						22
23	Pressure Unit Development										FC														23
24	Test of Fire Hose			FC							FC			FC											24
25	Use of Cowan Couplings									FC			FC	FC				FC							25
26	Storage of Fire Hose			FC														FC							26
27	Hose Transp. on Fire Trucks										FC				FC			FC							27
28	Water Use on High Hazard Areas												FC		FC			FC							28
29	Snag Felling Tools			FC						FC	FC			FC											29
30	Fires in Standing Snags	FC								FC			FC	FC	FC										30
31	Fire Report Time Study	FC	FC				FC							FC		FC	FC		FC						31
32	Emergency Fire Rations	FC								FC	FC								FC	FC		FC	FC		32
33	Lightning Fire Time Analysis	FC		FC		FC			FC		FC			FC											33
34	Little Wenatchee Watershed Study																					RO			34

*Assignments not previously listed
FM, RM, PC, etc. indicate Regional Office Branch responsible for Plan, Supervision and Follow-Up